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ABSTRACT

This teacher's guide accompanies a videotape of the same name. Experts from the fields of energy and the environment, along with an official from the U.S. Department of Energy, discuss these concerns. The video is a condensation of five programs produced by Close Up Television and Video as part of a national institute for high school social studies and science teachers sponsored by the Center for Energy Education. This teacher's guide provides tools to help students better understand energy and environmental issues. The teaching strategies and activities contained in the guide can be used in a variety of ways and adapted to suit classroom needs. (EH)

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ED 395 882

ENERGY, THE ENVIRONMENT, AND PUBLIC POLICY

TEACHER'S GUIDE

Developed by
Charles R. Sass and Amy N. Edwards

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CLOSE UP FOUNDATION

Close Up Publishing

The Close Up Foundation is a nonprofit, nonpartisan organization that encourages responsible participation in the democratic process through educational programs and publications in government and citizenship. Since its founding in 1970, Close Up has been committed to developing new and better ways for young people, teachers, and a widening circle of citizens of all ages to gain a practical understanding of how public policy affects their lives and how individual and collective efforts affect public policy. Close Up Publishing develops books, teacher's guides, and other materials designed to encourage critical thinking and inspire interest in current issues, government, foreign affairs, history, and economics. To find out why more and more educators are relying on Close Up's original and timely educational resources, call 800-765-3131.

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CONTENTS

To the Teacher 3
Motivator and Student Activities 5
Student Handouts 14

TO THE TEACHER

In the 1990s, the conflict between energy use and environmental concerns looms as one of the nation's major problems. Americans want inexpensive and readily available energy, but they also want a clean environment. This dual desire raises questions. Can we reduce air and water pollution if we continue to depend heavily on fossil fuels? Will energy remain cheap and abundant if we lessen our dependence on fossil fuels? How many more years before fossil fuels run out? Will alternative energy sources be fully developed by then? What will be the government's role in addressing America's energy and environmental dilemmas? These questions require all Americans to better understand the costs, benefits, and trade-offs of energy use and environmental protection.

In the 26-minute video "Energy, the Environment, and Public Policy," experts from the fields of energy and the environment along with an official from the U.S. Department of Energy discuss these concerns. The video is a condensation of five programs produced by Close Up Television and Video as part of a national institute for high school social studies and science teachers sponsored by the Center for Energy Education. The Center for Energy Education was created by the Close Up Foundation, the University of Oklahoma, and the U.S. Department of Energy to promote an interdisciplinary approach to energy and environmental education.

This teacher's guide provides tools to help students better understand energy and environmental issues. The teaching strategies and activities contained in the guide can be used in a variety of ways. Feel free to develop or adapt the activities to suit your teaching style and the amount of time you have.

SPEAKERS

The following speakers appear on the video in the order listed below:

Susan Tierney—United States Department of Energy
Charles Mankin—Oklahoma Geological Survey
Mickey Thompson—Oklahoma Independent Petroleum Association
Stephen Miller—Center for Energy and Economic Development

Ken Murphy—Environmental and Energy Study Institute
Scott Denman—Safe Energy Communication Council
Edward Krapels—Energy Security Analysis
Ken Zweibel—National Renewable Energy Laboratory

GOALS

The video and the activities in this guide should help your students to:

1. become more aware of the importance of inexpensive and readily available energy to the U.S. economy.

2. recognize the dilemma of balancing environmental concerns with increasing energy needs and decreasing resources.

3. understand and evaluate the role of the federal government in maintaining this balance.

STRUCTURE OF THE TEACHER'S GUIDE

The *Energy, the Environment, and Public Policy Teacher's Guide* contains the following components:

Objectives. The student objectives include both cognitive and affective goals to help you measure student learning.

Motivator. The motivator is an introductory activity that helps you introduce the topic of energy to your students and get them thinking about the important relationships between energy, the environment, and the lives of all Americans.

Student Activities. The teacher's guide contains four activities that require students to exercise their critical-thinking skills, write, do research, work in groups, and survey the community.

Student Handouts. Student handouts can be reproduced for classroom use. Each handout is part of a student activity.

Additional Suggestions. After you have completed the study of the video, you may want to use one or more of the additional suggestions to allow students to expand their knowledge about energy, the environment, and public policy. Or, in the interest of time, you may want to substitute one of the additional suggestions for a student activity.

MOTIVATOR AND STUDENT ACTIVITIES

Objectives. Upon completion of the motivator and student activities, students should be able to:

1. explain the important relationship between energy and the economy.
2. discuss the advantages and disadvantages of using fossil fuels to meet the nation's energy needs.
3. speculate on the future of fossil fuels and renewable energy sources.
4. list and describe alternative energy sources and their place in the overall energy picture.
5. analyze the relationship between environmentalists and the fossil fuel energy industry.
6. identify the energy needs of Americans and discuss the government's role in ensuring that those needs are met.
7. survey and evaluate community opinions about energy.

Using the Activities. The motivator should be used before you show any part of the video. The first three student activities are built around viewing each of the three parts of the video separately with stops in between. Activity 4 and the additional suggestions can be used at any point before, during, or after showing the video. Feel free to photocopy the student handouts for the appropriate activities. Several of the activities have more than one part, which means you can use an activity in its entirety or any portion of it.

MOTIVATOR—ENERGY AND THE ECONOMY

Before showing students the video, "Energy, the Environment, and Public Policy," use the motivator to introduce the topic of energy and its importance to Americans and to the U.S. economy. Ask students how they are affected by energy. In what areas of their daily lives do they consume energy? Where does that energy come from? What effect does it have on their lives? Does it make their lives easier? Who pays for the energy they use? Is it expensive?

Then, focus the discussion on the relationship between energy and the economy. Ask students how cheap, readily available energy affects the U.S. economy. What would happen to the economy if energy costs went up—or down—dramatically?

Do students think the government should be involved in energy policy? Students should come away from this discussion with a clear understanding that the economy and energy are closely tied and that government is likely to be involved in setting energy policies.

This activity will ask students to consider the ramifications of energy-related events on the nation's economy.

Divide the class into seven groups representing:

1. the oil industry
2. the coal industry
3. the automobile industry
4. alternative energy industries (hydroelectric, solar, wind)
5. consumers
6. foreign trade interests
7. environmental interests

Tell the groups that you are going to mention several scenarios. After each, give the groups one minute to analyze how that scenario would affect, both positively and negatively, their particular interest group. After they have discussed the scenario, ask each group to share their conclusions with the whole class. Encourage other members of the class to mention any ramifications that the group may have missed. Have students analyze as many of the following scenarios as time allows:

- Oil prices climb sharply.
- The government relaxes pollution standards for U.S. industries and automobiles.
- War breaks out in the Middle East.
- Oil prices decrease drastically.
- A German company develops an inexpensive synthetic fuel.
- A major oil spill fouls the shoreline of San Francisco Bay.
- Fuel-efficient foreign-made automobiles grab a larger share of the American car market.

ACTIVITY 1—ENERGY NEEDS AND FOSSIL FUELS

Before showing Part One of "Energy, the Environment, and Public Policy," distribute **Student Handout 1—Part One Viewer's Guide.** Then tell students to listen for comments made by speakers in the video that will allow them to fill in the blanks on Section A of the handout.

Show Part One, "Energy Needs and Fossil Fuels." Then, briefly discuss each fill-in-the-blank item in Section A of the handout.

Teacher note—the correct answers are: (1) right or political right; (2) crude oil; (3) gasoline, distilled water; (4) security; (5) Superfund, for sale; (6) low; (7) Saudi Arabia.

Next, lead a discussion based on the "what-if" questions in Section B of the handout. Encourage students to consider all possibilities of each potential "what-if." They should think about political, environmental, economic, and social ramifications.

Conclude by discussing the future of fossil fuels. Will they run out? Will the world continue to find new sources? Will they become unnecessary as new alternatives are found?

ACTIVITY 2—THE ENVIRONMENT AND ALTERNATIVE ENERGY SOURCES

Before showing Part Two of the video, ask students to speculate on the relationship between environmentalists and executives from the oil and coal industries. Why is the relationship likely to be antagonistic? What is there about fossil fuels that environmentalists do not like? You need only spend two or three minutes establishing the natural competition between these two groups.

Now that students are thinking about the environment, tell them that they are going to watch Part Two of the video, "The Environment and Alternative Energy Sources." While viewing, they should watch and listen for statements from the speakers that will help them answer the following five questions (which you have written on the board). Urge them to jot down potential answers as the video is running.

1. What has been the effect of environmental laws on the petroleum industry?

2. What are some alternatives to gasoline?

3. How popular are these alternatives?

4. What effect would establishing a market for alternative energy sources have on their availability?

5. What is the future of alternative energy sources?

After students have seen Part Two, lead a discussion based on the five questions. The following statements will help you lead the discussion:

1. The oil industry has seen production costs increase because of environmental laws. Industry officials are not happy with strict regulation, especially since their competitors in much of the rest of the world are not subject to strict environmental laws.

2. Alternatives mentioned include natural gas (a fossil fuel), solar power, and wind power. Other alternatives are synthetic fuels, nuclear power, and hydroelectricity.

3. Fossil fuels such as oil and gasoline are still the fuels of choice for transportation and power because they are cheap and available. Most other sources are used very rarely and are only found in places where they are cost effective.

4. When a large enough market exists for an alternative energy source to be profitable, that source will become available and affordable. For example, if companies in a certain area buy large fleets of vehicles that burn natural gas, sellers of that fuel will find it advantageous to open more outlets for its distribution.

5. When the development and distribution of alternative energy sources become cost effective, the use of such sources will expand. For example, if fossil fuels become too expensive for consumers because their supplies are diminishing, those consumers will turn to alternative energy sources that cost less. Expanded demand for and use of renewable sources will also lead to greater efforts by their manufacturers to make these sources more accessible and competitively priced.

To extend this activity, ask students to research what, if any, alternative energy sources are being used in their community. Have them interview both the providers and users of the source. Students should then write a one- or two-page paper describing the energy source and its efficiency and future.

ACTIVITY 3—PUBLIC POLICY

Tell students that while watching Part Three of the video, "Public Policy," they should listen for and jot down the four standards or goals of the Clinton administration's energy policy according to Susan Tierney of the U.S. Department of Energy. They are:

- Energy must be in large supply.
- Energy must be affordable.
- Energy must be clean.
- Energy must be accessible to everyone.

Show Part Three. After this part of the video is finished, return to the four items they were to watch for.

Discuss each briefly. Then ask the class how these four standards or goals would likely affect government policy about energy. What would happen if government policies were so stringent that they caused an energy shortage? What if the government raised gasoline taxes dramatically or placed huge import duties on crude oil from the Middle East? Would Americans be willing to go back to the days of dirty air if government deregulation meant they could cut their energy costs dramatically? How would people respond if government regulations made it impossible for some parts of the nation to get all the energy they needed while others had more than enough?

Remind students that government energy policy is driven by the demands of the people, but that people have differing opinions about the role of government in dealing with energy. Some would like to see the government stop regulating the energy industry. Others would like the government to enact stricter conservation and environmental laws. Now, tell your class that they are going to survey their community to find out the attitudes of the people living there.

Divide the class into pairs and give four copies of **Student Handout 2—Energy Survey** to each pair. Students should survey at least two people over the age of 35 and two under the age of 35. Questionnaires can be anonymous, but students should check the appropriate age blank of each respondent.

When students have completed their surveys, have them tally the responses for each question. Are they surprised by the results of the survey? Discuss what the survey reveals about citizens' knowledge of energy issues. Are there any significant differences in the opinions of the over-35 group compared to the under-35?

Expand the activity by having interested students write an article for the school or community newspaper based on the results of the class survey.

ACTIVITY 4—AVERTING THE NEXT ENERGY CRISIS

Begin by telling students that they are going to assume the roles of energy company executives. In their roles, they are going to prepare an argument to the president of the United States explaining why their industry should receive federal aid.

Divide students into pairs; one will play the role of chairman or chairwoman of the board and the other the role of chief executive officer of one of the following companies:

- Grain Squeezers, Inc.—a Nebraska company that produces ethanol alcohol from corn
- Red Hot Carbon—a West Virginia company that supplies nearly half of all the coal burned on the East Coast
- Lightning Volts—a Washington utility company that operates ten large hydroelectric dams in the Pacific Northwest
- Big Inch Pipelines—an Oklahoma pipeline company that transports natural gas to all states west of the Mississippi River
- Atom Smashers, Inc.—a Florida company that builds and operates nuclear power plants
- Caliente del Sol—an Arizona company that develops and manufactures solar heating panels
- Breeze-Gen, Inc.—a Vermont company that develops and manufactures large-output wind generators
- JetTexas Refiners—a Texas petroleum importer and refiner

After students have been paired and know their roles, read the following scenario:

> *Nearly all geologists around the world are now convinced that the earth's supply of petroleum will run out in twenty-five years if usage continues at its present pace. The president of the United States has decided to accelerate development of alternative energy sources so that the country is ready when the oil is gone. To do that, the president has increased spending on energy research and development in the federal budget to a total of $30 billion per year. The money will be granted to energy companies to allow them to improve technology and production so they can meet the nation's energy needs twenty-five years down the road. Who should get that money? You, as energy company executives, want to convince the president that if given the resources, your company can deliver the necessary power when the oil runs out.*

After students understand the situation, give them adequate time to learn more about the energy source they represent. They should try to find out how much energy their source now produces and what drawbacks keep it from producing more. They may be able to find adequate information in a library, or they might want to contact actual energy companies who can give them the details they need. Note that one of the companies is an oil company. The oil company's case should probably focus on how it could be more efficient and stretch the time before the oil is gone and it goes out of business.

After students have gathered the information they need and have learned more about the industry they represent, they should develop a presentation to the president during which they will make their case for getting a large amount of the federal money. In their presentations, they should tell a little about their industry's history, about what they are doing now, and most importantly, about their future. They want to convince the president that if given the necessary resources today,

they can avert another energy crisis twenty-five years from now. Give students copies of **Student Handout 3—Energy Crisis Worksheet** to help them focus their work.

When students are ready, ask each pair to come to the front of the room and tell why their company can do the job if given the money. You may want to appoint a "president of the United States" who will make a final decision, or you may want to ask the class to serve as president and vote on a decision after everyone has finished. The president or class members may want to question the presenters.

When presentations are complete and a presidential decision has been handed down, debrief by asking students which industry they thought made the best case and why. Did students learn more about alternative energy sources? Is it realistic to think that oil supplies may run out in their lifetimes? Do they see a bright future for alternative energy?

ADDITIONAL SUGGESTIONS

1. One way to introduce the study of energy would be to ask students to think back over their activities of the previous day and list all the sources of energy they used. For example, did electric clock radios wake them up? What energy sources did they use for their showers? For their breakfasts? For transportation to school? What other energy sources do they use in their homes? In their schools? Ask them to speculate on how the electricity is generated in their community. Does it come from hydroelectric dams? Nuclear power plants? Burning coal or diesel fuel? Are they surprised by all the ways they use commercial energy? What would they do if all or part of their energy supply was interrupted?

2. Begin by telling students that in this activity they are going to write a letter to a fictitious senator. Set the stage by explaining that a bill has been introduced in Congress that will raise gasoline taxes to $1 per gallon. The sponsors of the bill believe that such an increase will reduce U.S. dependency on imported oil, make the environment cleaner, cut the budget deficit, and cause people to consume less gasoline. Students should choose one of the roles listed below and write a one-page letter to the senator either supporting or opposing the bill. Their letters should reflect both the practical and emotional reasons why they oppose or support the bill. List the following occupations on the board:

   - A rancher grazing cattle on 30,000 acres in Montana
   - The owner of a gasoline station in New York
   - A Washington, D.C., office worker who uses public transportation to get to and from work
   - The owner and operator of a cross-country freight truck

- A used car salesperson
- A retired police officer who no longer drives a car

After students have finished writing, ask several to read their letters in class. Try to let the class hear from as many of the above occupations as possible.

3. Several speakers in the video mention that the oil industry of the United States cannot compete very well with the oil industries of other nations. One expert points out that it is cheaper for Saudi Arabia to pump and ship one barrel of crude oil to the United States than it is for U.S. companies to simply produce one barrel. He also mentions the military effort required of the United States to protect shipping lanes in the Persian Gulf. Another speaker comments on the unprofitability of U.S. oil refineries and notes that many of them are for sale. Some politicians and business leaders have proposed that the U.S. government subsidize some American industries—including the oil industry—to allow them to compete more favorably with foreign companies. They argue that if American farmers can receive crop subsidies to remain in business, so should other U.S. industries.

   Organize classroom debates on giving government subsidies to domestic oil producers and refiners. Assign individuals or teams either the affirmative or negative side for the following statement:

   > *The federal government should subsidize the U.S. oil industry to keep it competitive in the world marketplace.*

   Choose a timekeeper to make sure that both sides are given the same amount of time to present their arguments. You should also choose a moderator to keep the debate moving and orderly. The affirmative side should go first, followed by the negative side. Each side will then have a short time for rebuttal. Allow remaining members of the class to decide which side "won." Debrief by discussing the strengths and weaknesses of each side's arguments.

4. Have students write a one-page essay about how they think life in the United States and the world in 2050 will be shaped and affected by: 1) the results of our present-day energy consumption; and 2) new alternative energy sources. Encourage them to be creative but realistic in predicting such items as how homes will be heated, cars will be fueled, factories will be powered, and the environment will be affected. Ask for volunteers to read their essays in class.

5. There are many sources of information about energy-related issues, including the agencies and organizations listed below. Ask students to write or call for information about specific topics that you have assigned and then prepare a presentation to share with the class. Such topics may include:

- exploration for new sources of energy
- research on alternative energy sources
- government policy on exploring public land for energy sources
- environmental regulations on fossil fuel and other energy industries
- oil and coal industry research on making fossil fuel consumption cleaner
- how nuclear energy works
- the future of nuclear energy

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Environmental Protection Agency
401 M Street, S.W.
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U.S. Senate
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U.S. House of Representatives
Energy and Commerce Committee
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American Petroleum Institute
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American Nuclear Energy Council
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STUDENT HANDOUT 1

PART ONE VIEWER'S GUIDE

As you watch Part One, "Energy, the Environment, and Public Policy," listen for statements from the speakers that will help you fill in the blanks for each of the following items. Because they are one-word answers, you can jot them down while the tape is running.

SECTION A

1. Access to energy is almost a _____.
2. Transportation uses about 40 percent of the nation's energy needs. Almost all comes from _____.
3. Oil refineries are very efficient because they can produce a gallon of _____ for about the same price as you can buy a gallon of _____.
4. If the country loses its refining capacity, there is a danger to national _____.
5. _____ is a cloud over refining. Nearly all refineries are _____.
6. Industry thrives when energy costs are _____.
7. The U.S. petroleum industry cannot compete with _____.

SECTION B

Now that you have seen Part One of the video, write a response to each of the following. What if:

1. importation of all crude oil to the United States suddenly stopped?

2. all cars and trucks could easily be switched over to burn natural gas, which would sell for half the price of gasoline?

3. the world's oil supply ran out in the next ten years?

4. the government increased the gasoline tax by $1 per gallon?

5. all gasoline taxes were eliminated and gasoline sold for around 70¢ per gallon?

6. huge new oil deposits were found in the United States, making all importation of oil unnecessary?

7. oil refineries were subjected to tighter environmental restrictions?

8. all environmental rules and regulations were lifted from the fossil fuels industries?

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STUDENT HANDOUT 2

ENERGY SURVEY

Age of respondent:

- ❑ under 35
- ❑ over 35

Below are several statements regarding energy issues in the United States today. Record your response by placing a check in the appropriate column (agree, disagree, undecided).

	AGREE	DISAGREE	UNDECIDED
1. Most domestic and world supplies of oil will be depleted within fifty years.	❑	❑	❑
2. The government should fund the research of renewable energy sources such as solar, wind, and water power.	❑	❑	❑
3. The government should subsidize the U.S. oil industry to help it compete with other countries' oil industries.	❑	❑	❑
4. The nation should make coal its major energy source.	❑	❑	❑
5. Because nuclear power is unsafe, new nuclear power plants should not be constructed.	❑	❑	❑
6. Alternative sources of energy could supply all of America's energy needs.	❑	❑	❑
7. I would be willing to change my lifestyle to conserve energy.	❑	❑	❑
8. Higher gasoline taxes would promote conservation and help balance the budget.	❑	❑	❑
9. The government should grant money to companies and individuals who are researching ways to make renewable energy available and affordable.	❑	❑	❑
10. The government should get completely out of the business of regulating energy companies and let them do as they wish.	❑	❑	❑

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STUDENT HANDOUT 3

ENERGY CRISIS WORKSHEET

Read the following scenario before starting work.

> *Nearly all geologists around the world are now convinced that the earth's supply of petroleum will run out in twenty-five years if usage continues at its present pace. The president of the United States has decided to accelerate development of alternative energy sources so that the country is ready when the oil is gone. To do that, the president has increased spending on energy research and development in the federal budget to a total of $30 billion per year. The money will be granted to energy companies to allow them to improve technology and production so they can meet the nation's energy needs twenty-five years down the road. Who should get that money? You, as energy company executives, want to convince the president that if given the resources, your company can deliver the necessary power when the oil runs out.*

Use the following questions to help you prepare your presentation to the president.

- What is the history of your industry?

- What is your industry doing now?

- What does your industry need to do to fill a major portion of the country's energy needs?

- How does your industry affect the environment?

- Why does your industry hold equal or more promise than other energy industries?

- What will you say to the president to convince the administration to give you billions of dollars for research, development, and construction?

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